Fires are a significant natural force, changing ecosystems and impacting plant and animal life. As northern regions experience warming, areas such as Canada's vast forests are increasingly susceptible to droughts and fires. Although forest fires are particularly common in western Canada, recent years have shown that severe fires can also occur in the eastern part of the country. **Since western Canada is considered to be more prone to wildfires, research on past fire activity has focused largely on it. The eastern part of the country has so far been omitted in these studies.** The main focus of research done so far in eastern Canada was on peatland fires. **Studying historical fire patterns can help us to understand and predict future fire activity.**

Peatlands, with thick layers of accumulated organic matter, act as natural archives, preserving information about past fires and environmental changes. Due to higher atmospheric moisture content caused by the proximity of the ocean, maritime peatlands in this region are less susceptible to fires, and therefore can store long-term, undisturbed records. Most of Canada's peatlands are located within the boreal forest, making them ideal objects for this type of study. Although fires in peatlands in this region are rare, nearby fires can still have significant effects on them.

This project aims to examine the interaction between climatic conditions (droughts) and fires in eastern Canada over the past 7500 years. By analysing two peat cores from a maritime raised peatland near Baie-Johan-Beetz (Quebec province), we will investigate how fires have influenced the region over time. In this project we will reconstruct the comprehensive effect of fire on two major levels: regional (landscape with pollen, microcharcoal, loss-on-ignition, μ-XRF, and satellite data) and local (peatland ecosystem with testate amoebae, non-pollen palynomorphs, plant macrofossils, macrocharcoal, loss-on-ignition, μ-XRF, FTIR, and satellite data).

The research methods include identifying charcoal particles in peat to detect past fires, analysing pollen to reconstruct past vegetation and testate amoebae to reconstruct past hydrological conditions on peatland. Advanced methods (μ-XRF and FTIR) will be used to determine the chemical composition of peat. Palaeoecological data will be compared with historical observational data and satellite images. **This comprehensive approach will provide detailed information on how fires have affected eastern Canada's peatlands and forests.** It will elucidate the relationship between drought, vegetation, and fire patterns, and offer a holistic view of past fire activity by integrating traditional methods with innovative technologies.

The findings will enhance climate models to better predict future fire risks under changing climatic conditions and allow for a comparison of eastern Canada's fire history with that of western part of the country. **Ultimately, this project will contribute to a deeper understanding of the long-term impact of fires in eastern Canada, providing valuable insights for managing future fire risks in a warming world.**